tion of a tree is large in proportion to its conducting tissue, the wood of the tree will be composed largely of conducting and storage tissue; on the other hand, if the amount of transpiration is limited to any considerable degree, less conducting tissue will be required and the tree will have at its disposal a larger quantity of plastic material from which to produce mechanical tissue.—L. S. CHENEY.

Adaptation of African plants to climate.[4]

After some introductory remarks upon the highly interesting flora of Cape Colony, the author describes the different ways in which the plants are adapted to the climate. The variety of arrangements for this purpose is very great and may be considered from different points of view. The evaporation is prevented by reduction of the leaves, either by the development of small leaf-blades, or by transferring their function to green stems. Stapelia, Euphorbia and the imported Opuntia illustrate the last case, while small or narrow leaves are very common, for instance in Bruniaceæ, many Compositæ, and others. Some other plants show the surface of the leaves impregnated with substances that are impermeable to water, and this is to be observed in Aloe, Protea, Myrica and several others. The cuticle, or a cover of wax or silica, forms the protective medium in these plants.

A covering of hairs is also very common, by which the communication between the atmosphere and the air within becomes greatly impeded. Leucadendron, Helichrysum, several Læguminosæ, and Proteaceæ are protected in this way.

Secreted mineral substances may also form a protecting layer over the whole leaf as in Tamarix, or only over the depressions in which the stomata are situated, as in Statice, Vogelia, and other Plumbagineæ.

Such arrangements as the placing of the stomata in depressions or in grooves of leaves and stems, or under the reflexed edges of the leaves are also common in this vegetation.

Eucalyptus globulus and Protea grandiflora illustrate the case in which the leaves assume the most favorable position towards the sun.

There are also plants which possess reservoirs in their stems, rhizomes, or leaves. Such plants are the delicate herb, Ele-

[4] MARLOTH, R.—Some adaptations of South African plants to the climate. Trans. South African Phil. Soc. **6:** 31.

phantorhiza Burchellii, which has a huge watery rhizome, sometimes weighing ten pounds. Several Asclepiadeæ of the Kalahari region accumulate so much water in their tubers that the bushmen often depend entirely on it. The Stapelias and Euphorbias store the water in their stems and retain it with great tenacity. The remarkable Cissus Cramerianus of Damaraland has a large fleshy trunk and develops only a few thick branches.

Too rapid evaporation may also be prevented by sap contents of various composition, as for instance slime, gum or salt. The succulents are protected in this way, gum occurring in the Acacias, salt in Augea Capensis and Zygophyllum Marlothii. The salt is often deposited in such quantities that during the drying of the plant it crystallizes and forms a thick crust on it.

Hairs, glands or sheaths are the organs which enable the plant to absorb the dew. This is for instance the case with Salsola Zeyheri from the Kalahari region, where rain is rare. The depressed glands at the base of the leaves of Acacias seem to serve for the same purpose, for drops of dew running down along the rhachis must moisten them. Watsonia Meriana is protected by the large sheaths, which were found to contain water even many weeks after rain has fallen.

THEO. HOLM.